

Abstract

A VCSEL having improved diffraction loss,
comprising a series of deposited material layers
comprising the structure of the VCSEL, and an
intracavity lens formed in one of the series of
deposited material layers. In one preferred form of
the invention, the VCSEL comprises a bottom mirror
mounted to the top of a substrate; a bottom spacer
mounted to the top of the bottom mirror; a gain region
mounted to the top of the bottom spacer; a top spacer
mounted to the top of the gain region; and a top mirror
mounted to the top of the top spacer, such that a
reflective cavity is formed between the bottom mirror
and the top mirror; with at least one of the bottom
mirror, bottom spacer, gain region, top spacer and top
mirror containing a superlattice structure, and with an
adjacent region being subjected to ion implantation and
rapid thermal annealing so as to disorder the
superlattice structure and change its index of
refraction, whereby to create an intracavity lens so as
to reduce diffraction loss.

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